REMARKS:

1) Referring to item 4) of the Office Action Summary, it is noted that claims 1 to 4 had been canceled in the Second Preliminary Amendment filed with this application on February 25, 2002.

2) Referring to item 10) of the Office Action Summary, the Examiner is respectfully requested to approve the formal drawings that were filed with this application on February 25, 2002.

3) Referring to the Form PTO-892 enclosed with the Office Action, the Examiner is respectfully requested to correct the typographical error in the patentee name of reference "H", to ensure that this reference is correctly identified on the front page of any patent issuing from this application.

4) In accordance with the PCT procedures, the original specification of this application was a literal translation of the corresponding foreign-language PCT text. The specification has now been amended in an editorial and formal manner to better comply with typical US application format. For example, section headings have been inserted, and the specific reference to claim 1 by number has been avoided in the written description. Instead, the text of claim 1 has been copied into the description. The Abstract has been revised to better comply with US requirements. These merely editorial and formal amendments do not introduce any new matter. Entry thereof is respectfully requested.

5) The claims have been amended as follows. Independent claim 21 has been amended editorially and for clarification of an important feature of the invention, namely that the connecting elements (39, 41, 43, 45) are tension-only non-rigid connecting elements that are adapted and able to transmit only tension forces. The preferred example of such a tension-only non-rigid connecting element is a steel wire or cable. This clarification of claim 21 is supported in the original specification, e.g. page 6, lines 6 to 10; page 15, lines 3 to 5; page 20, lines 19 to 22; etc. The dependent claims have been amended wherever necessary for proper conformance with the amended independent claim, for clarification, and simply for streamlining of the claim terminology. New claims 41 to 48 have been added. The new claims are supported by the subject matter of the original claims and disclosure as shown in the following table, and do not introduce any new matter. Entry and consideration of the claim amendments and the new claims are respectfully requested.

New Claims	41	42	43	44	45	46	47	48
Original Support	Cl.40; pg.6, ln.9; pg.15; ln.3-4; pg.20, ln.22	Cl.21	Figs.2,3	Figs.2,3	Cl.40; pg.6, ln.9; pg.15; ln.3-4; pg.20, ln.22	Cl.40	Cl.22	Cl.40; pg.20, ln.19-25

6) Referring to page 2 of the Office Action, the rejection of claims 1 to 4 and 21 to 40 as indefinite under 35 U.S.C. §112, second paragraph is respectfully traversed. Claims 1 to 4 had been previously canceled. The specific unclear aspects pointed out

by the Examiner in claims 21, 23 to 26 and 37 have been addressed or avoided in the present amendment. The claim terminology is definite and clearly understandable by a person of ordinary skill in the art. The Examiner is respectfully requested to withdraw the rejection under 35 U.S.C. §112, second paragraph.

7) Referring to the last page (page 8) of the Office Action, the indication of allowable subject matter in claims 26, 27, 31, 32, 34 to 36, 38 and 40 is appreciated. This subject matter has been maintained in these claims, which should thus still be seen as substantively allowable. For the reasons that will be discussed below, it is respectfully submitted that independent claims 1 and 42 are also patentably distinguishable over the prior art, so that it should not be necessary to incorporate any of the previously indicated allowable subject matter into the independent claims.

8) Referring to pages 3 to 6 of the Office Action, the rejection of claims 1 to 4, 21 to 25, 28, 29, 33 and 37 as anticipated by US Patent 4,970,841 (Zeigler) is respectfully traversed. The Examiner has compared the struts (30 to 36) of the Zeigler arrangement to the tension-only non-rigid connecting elements (39, 41, 43, 45) of the presently claimed inventive structure. For the reasons that will be discussed next, that comparison or analogy cannot be supported, especially in view of the present clarification of the significant distinguishing features of these connecting elements.

9) In the inventive structure, the connecting element or elements (39, 41, 43, 45) are **tension-only non-rigid** connecting elements that are adapted and **able to transmit only tension forces**.

In a preferred example, these tension-only non-rigid connecting elements are embodied as steel wires or cables. See the present specification, e.g. at page 6, lines 6 to 10; page 15, lines 1 to 5; page 19, line 8; and page 20, lines 18 to 22.

It is clear that such tension-only non-rigid connecting elements are able to transmit only tension forces, and this is a significant characterizing feature of such connecting elements. For example, consider a steel wire or cable. If one tries to apply a compression force along a steel cable, the cable will buckle and crumple because it is limp and non-rigid and therefore has no ability to transmit such a compression force. Instead, the steel cable is only able to transmit a tension force, e.g. arising by pulling on opposite ends of the cable. On the other hand, a rigid rod or strut is able to transmit both compressive forces and tension forces. That is exemplified by rods, struts, columns, and the like, which can carry a weight or load applied to opposite ends thereof, by transmitting the arising compressive force along their length.

In the present context of deployable and collapsible framework structures, it is very important to distinguish between connecting elements (e.g. cables) that can transmit only tension forces, versus connecting elements (e.g. rods or struts) that can transmit both tension forces and compression forces. For example, in further preferred embodiments of the invention, the structure includes both cables that can transmit only tension

forces, and rods or struts that can transmit tension and compression forces. These two different types of connecting elements serve different purposes and are accordingly differently arranged. For a discussion of the rod-type connecting elements that transmit both tension and compression forces, see, e.g., the specification at page 6, line 13 to page 7, line 16.

From this discussion, in comparison to the explanation of the tension-only non-rigid connecting elements, it is clear that the two different types of connecting elements must be distinguished from each other.

10) Contrary to the present inventive structure, Zeigler does **not** disclose and would **not** have suggested the provision and arrangement of tension-only non-rigid connecting elements.

The connecting elements (30 to 36) according to Zeigler are **struts** (30 to 36) as explained throughout the disclosure (see especially col. 5, lines 24 to 42). Such struts are clearly and purposely adapted and able to transmit both compression forces and tension forces.

The dictionary definition of the word strut clearly demonstrates that a strut is commonly understood as an element adapted and able to transmit both compression forces and tension forces. For example, the McGraw-Hill Dictionary of Scientific and Technical Terms, 5th Edition, 1994 defines a "*strut*" as "*a bar designed to resist pressure in the direction of its length*" or "*a vertical-compression member in a structure*". The Funk & Wagnalls Standard College Dictionary, 1977, defines "*strut*" as "*a member in a framework, designed to relieve weight*

or pressure in the direction of its length". Thus, the commonly understood definition of the term "strut" shows that the struts (30 to 36) of Zeigler do not correspond to and would not have suggested the present tension-only non-rigid connecting elements that are adapted and able to transmit only tension forces.

Furthermore, the disclosure of Zeigler demonstrates that the struts (30 to 36) must be able to, and purposely do, transmit compression forces. For example, the arrangement shown in Fig. 3 will clearly involve the struts (34 and 35) transmitting compression forces to and/or from the corner connectors (at the upper left and upper right of the structure) in order to bear the self-weight load of the structure in the vertical direction, and whenever an external load presses vertically downward onto the top of the structure or horizontally onto the sides of the structure.

The Examiner has analogized the struts (10 to 17) of Zeigler to the present inventive elements that transmit both compression and tension (in connection with present claim 22). Since the elements (10 to 17) and the elements (30 to 36) of Zeigler are all undifferentiated struts, and the Examiner recognizes that the struts (10 to 17) transmit both tension and compression, it must correspondingly also be recognized that the struts (30 to 36) similarly transmit both tension and compression. Namely, since the reference does not disclose or suggest any difference in the load-bearing features of one group of struts (10 to 17) versus another group of struts (30 to 36), the Examiner cannot "interpret" such an undisclosed and unsuggested difference into the reference.

Moreover, the fact that the struts (34 to 37) are connected to pivot points (38 to 41) midway along the length of the other set of struts (30 to 33), shows that these struts (30 to 33) must be substantially rigid and able to bear compressive loads, because otherwise the struts (30 to 33) would buckle and crumple at the midway pivot points (38 to 41) whenever a load, either tensile or compressive, was applied thereto by the struts (34 to 37). In this regard, see Figs. 1 and 3 as well as col. 5, lines 24 to 38.

Still further contrary to the Examiner's assertion and contrary to the present claimed structure, the loading forces acting on the structure according to Zeigler are **NOT** transmitted as tension forces via the struts (30 to 36), but instead are clearly and definitely transmitted as compression forces. As discussed above in connection with Fig. 3 of the reference, it is clear that any load applied vertically onto the top of the deployed structure will be transmitted from the upper corners (22, 108) to the center hub (50) as compressive forces via the struts (34, 35) and as substantially transverse bending forces via the struts (30, 31). That is completely contrary to the present definition of the tension-only non-rigid connecting element, as well as the arrangement thereof, whereby the load forces are transmitted as tension forces.

It is also clear from the disclosure of the reference, that Zeigler purposely intends to transmit such load forces as compression forces through the various compression-bearing structural members (see generally col. 12, lines 24 to 30; and col. 5, lines 43 to 68). Particularly, Zeigler defines certain

"rules" that must be followed to ensure that the structure can be collapsed into a configuration with the struts disposed as a bundle of generally parallel struts. These rules only make sense and only apply in connection with substantially rigid compression-bearing struts, and do not directly or strictly apply to non-rigid limp connecting elements such as wires or cables, which can collapse, flex or buckle "out of the way" to some extent while collapsing the structure.

For the above reasons, a person of ordinary skill in the art would have found no suggestion to proceed according to the present invention using tension-only non-rigid connecting elements instead of the compression-bearing rigid struts according to Zeigler. A person of ordinary skill in the art thus would not have realized or expected the substantial advantages that can be achieved according to the invention in comparison to the use of compression-bearing struts as disclosed by Zeigler. For example, the kinematics of collapsing and folding the structure are substantially improved and simplified. A greater range and variation of the geometries of the structure can be achieved. An increased load-bearing capacity can be achieved, especially if the tension-only non-rigid connecting elements are pre-stressed in the deployed condition. Also, the pre-stressing of the wires or cables, for example, can achieve an over-center locking effect in a much simpler manner and without particularly worrying about the "rules" defined by Zeigler. Even with the increased loading capacity, a weight reduction can be achieved, because the present connecting elements can be lighter in weight in order to transmit only the arising tension forces, in

comparison to the substantially rigid strut members that must be able to bear compressive and bending loads without buckling.

11) For the above reasons, independent claim 21, as well as the claims depending therefrom, are not anticipated by, and would not have been obvious over, the disclosure of Zeigler. The Examiner is respectfully requested to withdraw the anticipation rejection of claims 1 to 4, 21 to 25, 28, 29, 33 and 37.

12) Referring to pages 7 and 8 of the Office Action, the rejection of claims 30 and 39 as obvious over Zeigler is respectfully traversed. Claims 30 and 39 depend from independent claim 21 which has been discussed above in comparison to Zeigler. For the above reasons, the invention of claim 21 and its dependent claims 30 and 39 would not have been obvious over the reference. The Examiner is respectfully requested to withdraw the rejection.

13) New independent claim 42 also emphasizes the feature of the inventive structure, regarding a <u>non-rigid limp connecting element that is adapted and able to transmit only tension forces</u>. In view of the above discussion of the Zeigler reference relating to the use of substantially rigid <u>compression-bearing struts</u>, the present invention of claim 42 is not anticipated and would not have been obvious. Favorable consideration and allowance of claim 42 and its dependent claims 43 to 48 are respectfully requested.

14) Favorable reconsideration and allowance of the application, including all present claims 21 to 48, are respectfully requested.

Respectfully submitted,

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Term Extension,
Form PTO-2038

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3/3/04

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